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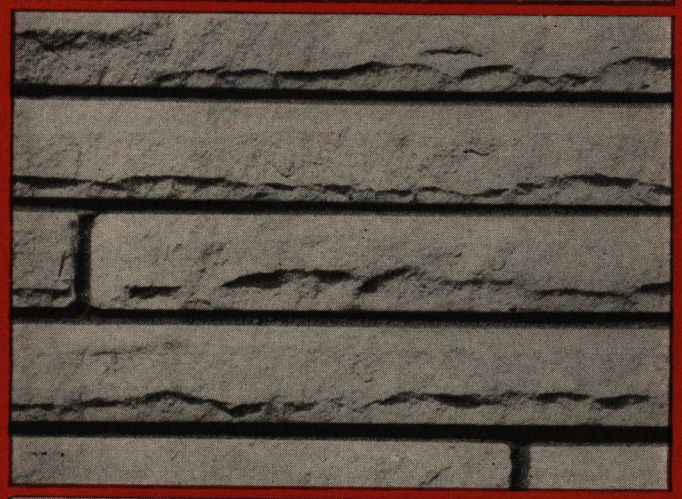


build better masonry

with ATLAS MORTAR CEMENT

A.I.A. File No. 3-A-9

Universal Atlas Cement Company

ATLAS MORTAR CEMENT... for better mortar... for better masonry

What is Atlas Mortar Cement?

Atlas Mortar Cement is a masonry cement specifically developed to produce a superior mortar for general masonry use. Because of its excellent plasticity and water-retaining characteristics, it provides exceptional workability and bonding properties. It further provides good yields and the desired setting and hardening properties.

In addition, it provides strength, durability and good color in one cementing material. It is easy to handle, and only sand and water need to be added to mix the mortar.

COMPOSITION OF ATLAS MORTAR CEMENT

It is masonry cement composed of skillfully proportioned amounts of portland cement or portland blast-furnace slag cement and limestone ground to a fine powder. Interground are precise amounts of gypsum to regulate setting time, also an air-entraining agent for plasticity and durability.

Atlas Mortar Cement well exceeds the requirements of current ASTM and Federal Specifications for both Type I and Type II masonry cements. Type I is for solid masonry construction above grade not exposed to frost action. Type II is for general masonry mortars.

Why Atlas Mortar Cement is BETTER

EFFICIENCY

Good mortar is easier to make with Atlas Mortar Cement. It reduces the number of materials to be stored, handled and mixed. This makes it easier to mix and to maintain more uniform mortar batches and masons can lay up more units and do best work.

ECONOMY

Saves time. The masons' time is a major cost item in masonry construction. Mortar that is easy to work with, calls for a minimum of retempering, and does not have to be pampered to remain workable, will save the masons' time on the job. Plasticity and cohesiveness of mixes reduces droppage and waste to the minimum. Jobs are easier to clean, less cleaning is needed.

QUALITY and UNIFORMITY

Atlas Mortar Cement is subjected to exacting quality control tests during its manufacture to assure uniformity and quality of performance. The company's technical service engineers in the field also study and appraise the product's merits under actual field use and conditions.

PLASTICITY

Mortar made with Atlas Mortar Cement has sufficient plasticity to work smoothly and spreads easily under the trowel. Plasticity of a mortar influences the ultimate bonding between the mortar and units and the resistance of walls to water penetration.

WATER-RETENTION

The ability of a mortar to retain its mixing water when placed on masonry units is of utmost importance. Different types of masonry units vary widely in porosity and absorption. High suction of absorptive units takes water away from the mortar. Mixes made with Atlas Mortar Cement strongly resist this suction, and the possibility of quick stiffening and drying out is greatly reduced.

Because of Plasticity and Water-Retention, Atlas Mortar Cement Mixes:

(a) Stick well to all types of units;

(b) Slip cleanly from the trowel, yet cling just enough to be easy to work with;

(c) Have the consistency, and body, necessary to hold heavy concrete block units in line;

(d) Because of its cohesiveness, mortar forced out from bed and end joints can be recovered, reducing waste.

YIELD

Atlas Mortar Cement is less sensitive to sand variations and gives comparably good yields with various masonry sands. Maximum yield is obtained by thorough machine mixing.

Proportions recommended are 1 bag of Atlas Mortar Cement to 3 cu. ft. of sand to give a satisfactory yield, excellent plasticity, and develop all the needed strength, except for very unusual conditions.

COLOR

The uniform color of hardened mortar joints may be an important and necessary mortar requirement. Atlas Mortar Cement helps to secure uniform mortar color in two ways: (a) it is the only cementing material used in the mortar; (b) its uniform color is controlled during manufacture. The color of the mortar is greatly influenced by the color of the sand used. For special color effects, mineral oxides and other suitable coloring pigments may be added.

WATER-TIGHTNESS

Good workmanship is the primary factor in obtaining water-tight joints in masonry structures. Mortar of excellent working consistency with less mixing water helps to minimize shrinkage and separation cracks through which water can enter. Mortar made with Atlas Mortar Cement helps to obtain a better bond, and therefore, more water-tight joints.

EFFLORESCENCE

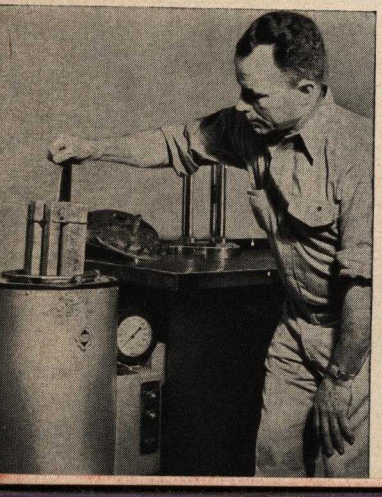
This crystalline material is deposited on masonry surfaces when the passage of water through masonry walls transports to the surface water soluble salts which may be present in either masonry units, sand, mortar or mixing water. It can be effectively minimized by water-tight masonry joints made with Atlas Mortar Cement.

VOLUME CHANGE

Low Expansion

The ASTM and Federal Specifications for masonry cement include a requirement for soundness as measured by expansion in the autoclave. Atlas Mortar Cement complies with these requirements by an ample margin. (See illustration below at left)

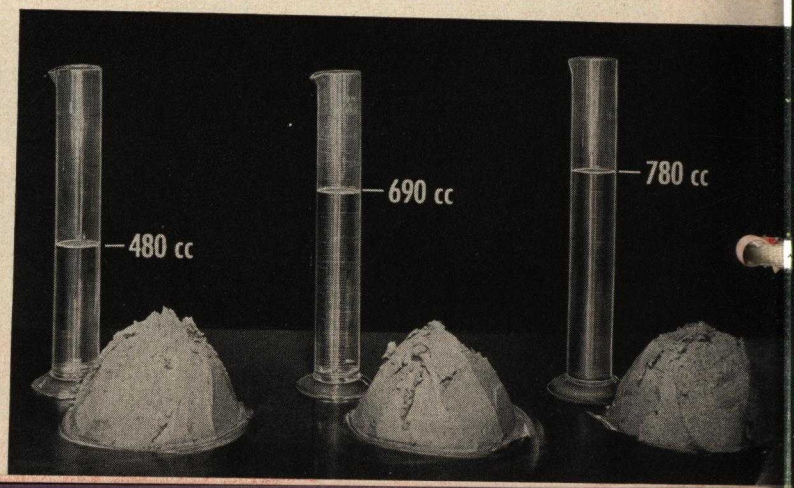
Test bars of Atlas Mortar Cement are placed in autoclave and subjected to saturated steam at 420 F; 295 psi. The length is precisely measured to 1/10,000 of an inch before and after autoclaving. Expansion is then calculated.



1:3 Atlas Mortar Cement Mix requires less water to produce a good working consistency than a . . .

1:1:6 Portland Cement-Lime Mortar Mix with equal volumes of portland cement and lime, or a . . .

1:2:9 Portland Cement-Lime Mortar Mix of 1 part of portland cement to 2 parts of lime.



Low Shrinkage
Excessive amounts of water used in mixing or retempering mortar may cause shrinkage cracks in the hardened mortar. Mortar joints made with Atlas Mortar Cement will have low shrinkage because a minimum amount of mixing water is needed. (See illustration at lower right of preceding page)

DURABILITY
Atlas Mortar Cement provides long-lasting resistance to weather and to the destructive effects of alternate freezing and thawing. An air-entraining agent is interground during the manufacture of Atlas Mortar Cement, resulting in billions of microscopically small air bubbles being formed and well dispersed through the mortar during mixing. These entrained air bubbles or cells in hardened mortar joints act as tiny expansion chambers that accommodate the pressure from expansion of freezing water within the mortar. In this way, the destructive effects of freezing are prevented and the need for costly repointing work is minimized.

STRENGTH
The ultimate strength of hardened masonry mortar is affected by the mix proportions, quality of sand and the amount of mixing water used. Rich mixes, such as 1:2, make stronger mortars. For general masonry work a 1:3 proportion of Atlas Mortar Cement to sand is recommended.

The ASTM Specifications for Mortar for Unit Masonry, C 270, contain requirements for compressive strength. These specifications also require that masonry cement conform with Standard Specifications for Masonry Cement, ASTM Designation: C 91. Atlas Mortar Cement conforms with current ASTM and Federal Specifications for masonry cement.

WORKABILITY RETENTION
The Universal Atlas Research Laboratories have developed a workability retention test which simulates job conditions. All Atlas Mortar Cement passes this exacting test.

RECOMMENDED PRACTICE

SAND
Sands affect workability, strength and durability of masonry mortar and should be graded from fine to coarse. Sand should be checked to comply with the following requirements of ASTM Specifications C 144.

Sieve No.	Per Cent Passing	
	Natural Sand	Manufactured Sand
4	100	100
8	95 - 100	95 - 100
16	60 - 100	60 - 100
30	35 - 70	35 - 70
50	15 - 35	20 - 40
100	2 - 15	10 - 25
200	.....	0 - 10

"Maximum permissible percentages by weight of deleterious substance are as follows:

Clay Lumps 1.0
Lightweight particles floating on liquid have a specific gravity of 2.0... 0.5[a]
(a) This requirement does not apply to blast-furnace slag aggregate."

A good masonry sand should not contain organic materials in injurious amounts and should be tested for organic impurities and rejected if it produces a color darker than the standard. Poorly graded sand may require more cement to get a workable mortar. It pays to use good sand.

WATER
The water used in mixing mortar should be clean and suitable for drinking.

PROPORTIONING
To develop adequate strength in the mortar, the proportions most often used are 1 part Atlas Mortar Cement to 3 parts of a masonry sand by volume. These proportions are generally recommended for mortar that will have the best all round qualities.

Richer mixes than 1:3 are only to be used for special structural purposes where extra strength is needed.

MORTAR PROPORTIONS AND COMPRESSIVE STRENGTH
PARTS BY VOLUME

MORTAR TYPE	ATLAS MORTAR CEMENT	PORTLAND CEMENT	SAND DAMP, LOOSE	AVERAGE COMPRESSIVE STRENGTH AT 28 DAYS, psi
M (A-1)	1	1	4.5 to 6	2500
S (A-2)	1	½	3.4 to 4.5	1800
N (B)	1	...	2.25 to 3	750

Adapted from Tables I and II of Specifications for Mortar for Unit Masonry, A.S.T.M. Designation: C 270.

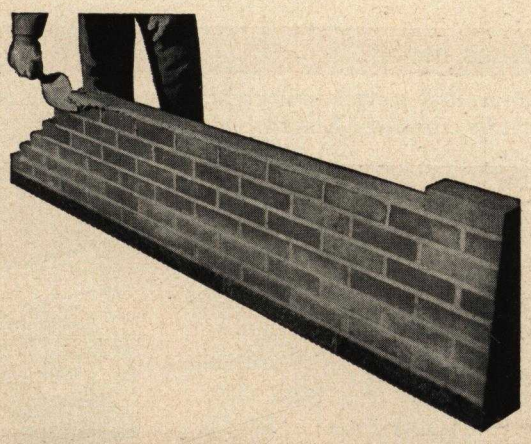
MACHINE MIXING
Machine mixing should be used whenever possible, and should continue for at least three minutes. Extra mixing, up to five minutes, improves the mortar and results in better workability and water-retention.

HAND MIXING
This method is sometimes used today where small amounts of mortar are needed. Machine mixing, however, is preferred and should be used whenever possible.

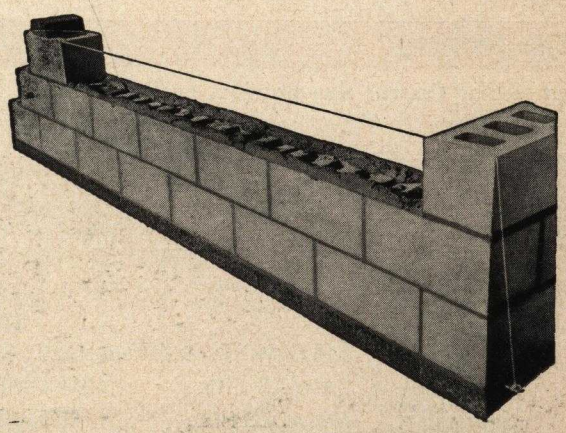
RETEMPERING
When a batch of mortar has been exposed to the open air on the mortar board for a prolonged period of time, it begins to stiffen. Batches made with Atlas Mortar Cement can usually be restored by working the mortar with a trowel. When mortar is exposed to a hot sun and drying winds, it may require retempering much sooner than on a cool, cloudy, humid day. Remixing alone may not restore the proper consistency. In such cases, small amounts of water may be added, but the total amount should be kept to a minimum. Proper workability of the mortar should be maintained because of its important effect on development of good bond with the units.

WETTING BRICK
Absorptive brick must be thoroughly wetted before laying to obtain good masonry. There should be no free water on the brick surface when laid.

In brick masonry construction, mortar for bed joints should be spread thickly and uniformly. See next page.



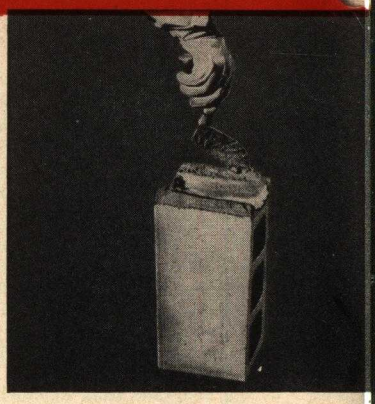
With block walls, face-shell bedding is preferred because it improves the ability of the wall to resist the passage of water. See next page.



ATLAS MORTAR CEMENT... for better mortar... for better masonry

The head of the brick should be well buttered with mortar before being "shoved" into a full bed.

Brick being placed should be thickly buttered on the end and "shoved" into place. Both the head and bed joints should be completely filled so that excess mortar is squeezed out.



Head joints for block should be full of mortar on both the inner and outer edges.

WORKMANSHIP

Full joints for brick

The first rule of good workmanship in brick masonry construction is to fill all head joints and bed joints completely with mortar. Bed joints should not be furrowed. With Atlas Mortar Cement, the mortar for the bed joints can usually be spread over several bricks, but the mortar must be soft and plastic when the bricks are bedded.

Full face-shell bedding for block

Face-shell bedding should be used in laying up concrete block except where good practice calls for full bedding. For the first course on the foundation, for pilasters and piers and where maximum strength is required, full mortar bedding should be used, on the cross webs of the block as well as the face shells. In face-shell bedding, mortar should be spread fully to cover both the face shells.

Alignment

Once a masonry unit has been placed, any tapping into alignment with the trowel must be done while the mortar is still fresh and soft. Tapping a unit into alignment after the mortar has stiffened is a serious infraction of the rules of good workmanship. If it should become necessary to shift the position of a unit after the mortar begins to set, both the unit and mortar should be removed from the wall and the unit relaid with fresh mortar. For good block work, Atlas Mortar Cement provides sufficient body to the mortar to hold the weight of the block, and at the same time, the mortar retains sufficient plasticity to allow the block to be tapped easily into alignment.

Tooling

Tooling of the mortar joints helps to assure weather-tight walls. Unless otherwise specified, all exterior joints on concrete block masonry should be tooled. A rounded tool slightly larger than the joints is preferred. Tooling of joints should not be considered a remedy for incomplete filling of joints. On block walls, architectural design may favor tooling only the horizontal joints, the vertical joints being trowelled flush. This is especially popular where the wall is to be finished with cement paint.

Plastering

An excellent way to improve the resistance of any wall to water penetration is to plaster mortar on the back facing, or to plaster the face of the back-up wall units, with the same mortar used in laying wall units. Usual thickness for plastering is from $\frac{1}{4}$" to $\frac{3}{8}$". Before plastering is begun, mortar joints must be struck smooth. The use of plastering is recommended practice, especially an exterior coating below the ground level of concrete block basement walls to make them more waterproof. Walls are plastered on the earth side from top of footing to 6" above the ground level with two $\frac{1}{4}$" coats applied according to directions offered under STUCCO (below). When second coat is properly cured, it should be brushed with an asphalt primer and two coats of hot bituminous material.

Atlas Mortar Cement for Stucco

Atlas Mortar Cement can cut costs in stucco work because it saves considerable time by eliminating prolonged waiting periods for curing and drying between application of coats.

It can be applied to concrete, cement blocks, brick or metal lath bases. Directions for preparing the base surfaces and applying the stucco will be sent on request.

Tile Setting

Atlas Mortar Cement also provides an excellent bed for setting wall tile.

Glass Block

To insure full mortar joints with glass block the mortar should be crowned when applying it to the block.

UNIVERSAL ATLAS CEMENT COMPANY

United States Steel USS Corporation Subsidiary

100 PARK AVENUE, NEW YORK 17, N. Y.

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